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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,289	09/30/2003	Junichi Hoshi	03500.017625	4738

5514 7590 11/02/2005

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30 ROCKEFELLER PLAZA  
NEW YORK, NY 10112

EXAMINER
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SUNG, CHRISTINE

ART UNIT	PAPER NUMBER
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2884

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/673,289		HOSHI, JUNICHI	
	<b>Examiner</b>		<b>Art Unit</b>	
	Christine Sung		2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1103, 0903</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malinovich (US Patent 6,168,965 B1) in view of Abramov (US Patent 4,577,345).

Regarding claim 1, Malinovich discloses, a back side incident type image pickup sensor (figure 6(A)) having on the front side (element 310) of a semiconductor substrate (element 300) a photoelectric conversion portion (element 100, see figure 3B, element 110) and an electric circuit (element 100, see figure 3B, element 120), and having on the back side (element 320) of the semiconductor substrate (element 300) where a radiation beam is incident (column 10, lines 5-7), the incident radiation beam being detected by the photoelectric conversion portion or light sensitive pixel region (figure 3B, element 110) formed on the front side (Figure 3B, 310) of the semiconductor substrate (element 300), wherein the electric circuit (element 120) is disposed at a given distance in the horizontal direction from the wafer (element 300). Although Malinovich does not specify an opening on the backside, Abramov discloses a fingerprint detection device with an opening (see figure 8, area where finger is placed). One of ordinary skill in the art would be motivated to include an opening on the backside to increase the accuracy of radiation detection by securely positioning the object of interest. Further, although the references do not explicitly specify that the electric circuit is a horizontal distance from the opening, it would be

Art Unit: 2884

obvious to one having ordinary skill in the art, in order to increase the longevity of the of the circuit components by reducing its exposure to radiation by placing it in a position where it cannot receive radiation.

Regarding claim 2, Malinovich discloses a backside incident type image pickup sensor, wherein the semiconductor substrate (Figure 3B, element 300) is a single crystal silicon substrate (column 6, lines 7-9).

Regarding claim 3, Malinovich discloses a back side incident type image pickup sensor, wherein the semiconductor substrate is reduced in thickness after a semiconductor integrated circuit that constitutes the photoelectric conversion portion is formed (see reduction of wafer 300, between figures 4A and 4B).

Regarding claim 4, Malinovich discloses a back side incident type image pickup sensor, wherein the radiation beam is infrared light (column 1, lines 24-25).

Regarding claim 5, Malinovich discloses a back side incident type image pickup sensor, wherein the infrared light has a wavelength is in the NIR range (column 1, lines 24-25), which by definition is in the range of 700 to 1400 nm, encompassing the claimed range.

Regarding claim 6, although Malinovich in view of Abramov does not explicitly specify that the radiation beam is an X-ray. However, CCD technology is used for both IR and X-ray radiation detection, therefore it would be obvious to one having ordinary skill in the art to modify the invention to detect x-ray radiation.

Regarding claim 7, Malinovich discloses a backside incident type image pickup sensor, wherein the photoelectric conversion portion is composed of a photodiode (column 1, lines 55-59 and column 2, lines 1-2).

Regarding claim 8, Malinovich discloses a back side incident type image pickup sensor, wherein the electric circuit (element 120) serves as one of a driver circuit for driving the photoelectric conversion portion or readout and a signal processing circuit for processing a signal from the photoelectric conversion portion (column 2, lines 1-44).

Regarding claims 9-10, Malinovich in view of Abramov does not specify the exact distance between the circuitry and the opening. However, such a distance is a result effective variable, depending on the radiation used, the stopping power of the detector material and the positioning of the opening.

3. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malinovich (US Patent 6,168,965 B1) in view of Abramov (US Patent 4,577,345) further in view of Suguwara et al. (US Patent 6,724,855 B2).

Regarding claims 11-12, Malinovich in view of Abramov disclose the limitation set forth in claim 1, but do not specify forming a dummy pixel or diffusion region between the electric circuit and the opening. However, dummy pixels or diffusion regions are known as disclosed by Suguwara et al (see figure 2, element DA and DB). One of ordinary skill in the art would be motivated to use the dummy pixel or diffusion regions as disclosed by Suguwara et al. with the invention as disclosed by Malinovich in view of Abramov in order to decrease the amount of extraneous radiation from reaching the detector in error, thus increasing the detector accuracy.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Sung whose telephone number is 571-272-2448. The examiner can normally be reached on Monday- Friday 7-3 pm.

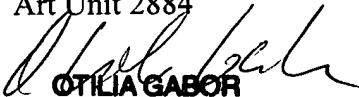
Art Unit: 2884

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CS

Christine Sung  
Examiner  
Art Unit 2884

  
**OTILIA GABOR**  
**PRIMARY EXAMINER**